

CHAPTER 2 - ALTERNATIVES

Introduction

This chapter describes the public involvement process and the alternative management approaches for the Lyman Salvage Project considered by the Forest Service. It includes a discussion of how alternatives were developed, how they respond to the key issues, mitigation measures, monitoring and other features common to all action alternatives, and a description and map of each alternative considered in detail. Chapter 2 presents the alternatives in comparative form, defines the issues and provides the basis for choice among options by the decision maker and the public (40 CFR 1502.14).

Some of the information used to compare alternatives at the end of Chapter 2 is summarized from Chapter 3, "Affected Environment and Environmental Consequences." Chapter 3 contains the detailed scientific basis for establishing baselines and describing the potential environmental consequences of each of the alternatives. For more detailed information on the effects of the alternatives, readers should refer to Chapter 3.

Public Involvement

Scoping

The Council on Environmental Quality (CEQ) defines scoping as "...an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). Among other things, the scoping process is used to invite public participation, to help identify public issues, and to obtain public comment at various stages of the planning process. Although scoping is to begin early, it is really an interactive process that continues until a decision is made. In addition to the following specific activities, the Lyman Salvage Project has been listed on the Bitterroot National Forest quarterly Schedule of Proposed Actions since January 2003. That schedule is made available to many individuals, groups, and agencies. To date, the public has been invited to participate in the project in various ways, as described below.

Public Mailing

The Forest Service mailed a letter and map describing the proposed project to various people, organizations, and other agencies on December 10, 2002. Those contacted were invited to submit comments and questions on the project proposal by January 13, 2003. A total of five responses to this mailing were received.

Local News Media

A legal notice was published in the Ravalli Republic newspaper on December 13, 2002. This notice provided details on the project and invited people to comment during the scoping period.

EA Review and Comment Opportunity

Availability of this EA has been publicized, and it has been made available to the public, tribes, and other agencies for review and comment. Following the 30-day review and comment period, the Responsible Official will consider all comments prior to making a decision on the project.

Issues

The Interdisciplinary Team sorted the scoping comments into categories to facilitate issue tracking and responses. The issues are categorized as follows:

Key Issues

Issues used to develop the alternatives and specific activities in the action alternatives. These are described below.

Analysis Issues

Issues addressed by describing the affected environment or by analyzing and describing the effects of activities. The affected environment and effects of the project alternatives are described in Chapter 3 for each of the following topics:

Fire and Fuels	Threatened, Endangered, and Sensitive (TES) Plants
Air Quality	Noxious Weeds
Soil Productivity	Wildlife
Watersheds	Recreation and Inventoried Roadless Areas
Fisheries	Scenery
Heritage Resources	Human Health
Forest Vegetation	Social and Economic

Key Issues

Key issues for the Lyman Salvage project were identified through public and internal scoping. Similar issues were combined into one statement where appropriate. The following issue directly influenced the alternative formulation. The ways that each alternative address the key issues are discussed under the alternative descriptions later in this chapter.

Impacts on Soils and Watersheds

Some commentors expressed concern for potential logging impacts to soils (erosion, compaction and displacement), and watersheds (erosion and sediment).

Economics

Product deterioration (checking, insect damage, etc) that has occurred in the three and one half years since the fires of 2000 has reduced the value of the fire killed trees, particularly for small saw log size material (trees less than 14" DBH). The economic feasibility of certain harvest units or portions of harvest units included in the proposed action may be marginal, particularly areas that are more heavily stocked with smaller fire-killed trees.

Alternative Development Process

The ID Team used information from public scoping, including the key issues identified for the project, in conjunction with resource inventories and field information, to formulate different alternatives. The ID Team developed treatment prescriptions for different activity units to create the various alternatives. The alternatives provide different responses to the key issues; one alternative may respond to more than one issue. Each action alternative is also designed to at least partially meet the purpose and need for action and move toward the desired future conditions described in Chapter 1.

Each action alternative represents a site-specific proposal developed through interdisciplinary evaluation of current and desired conditions and is based on field verification. Unit identification and design also made use of topographic maps and aerial photos, and resource data available in geographic information system (GIS) format.

Alternatives considered in this analysis represent a reasonable range of approaches to meet the purpose and need of the project. The Responsible Official may, at the time of the decision, select any of the alternatives or combine or eliminate specific elements of alternatives that were analyzed.

Alternatives Considered in Detail

Three alternatives are considered in detail. Alternative 1 is the No Action alternative, which includes no activities at this time; therefore the project area would remain subject to natural or ongoing changes only. The other alternatives present different ways of satisfying the purpose and need while addressing key issues. Maps of the action alternatives are provided.

Acres, miles, other quantifiable amounts, and mapped unit boundaries that are used to describe the alternatives are based on the best available information without precise field measurements. If an action alternative is implemented, some relatively minor differences in quantities may result from detailed field preparation and layout. Because of the

variability of existing conditions in proposed activity units, treatments are not expected to occur on every acre within every unit.

Alternative 1

Alternative 1 is the “No Action” alternative. This Alternative responds to the key issue regarding impacts to soils and watersheds because it would conduct no salvage harvest activities in the Lyman project area at this time. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14d) requires that a “no action” alternative be analyzed in an EA or EIS. This alternative represents the existing condition against which the other alternatives are compared and is also a viable alternative that could be selected. There would be no change in current management or ongoing activities in the project area with this alternative. On-going activities in the area include routine road maintenance, dispersed recreation, and livestock grazing. Although there would be no impacts to soils under this alternative there would also be no actions to restore previously impacted soils.

Alternative 2 (Proposed Action)

The Forest Service presented the activities in Alternative 2 to the public as the Proposed Action in the scoping letter.

Timber Harvest Activities

Wood products would be salvaged from about 569 acres of National Forest land by conducting harvest activities as described below. All harvest activities would occur in Forest Plan MAs 1 and 2.

Several silvicultural prescriptions would be applied depending on stand conditions, as described below. This work would be accomplished using a timber sale contract or Forest Stewardship Contract. Following harvest, fuel treatment activities would occur which would include manual and prescribed fire activities; these are also described below. Planting would occur as needed in any of the treatment units depending on the natural regeneration present following harvest.

Table 2-1 describes the harvest and fuel reduction activities that would occur in each activity unit and Map II-1 shows the locations of the activity units and roads. Management Requirements and Mitigation Measures that apply to Alternative 2 are described later in this Chapter (see Table 2-4).

Salvage Harvest

Salvage harvest would occur in stands where the level of tree mortality is such that the stand would still be considered adequately stocked following the harvest. Dead or dying trees, including those infested by bark beetles, would be harvested to recover economic value. Incidental live tree removal may also occur to facilitate logging operations and in trees affected by root rot, stem decay, other pathogens, or severe fire damage. Adequate levels of snags and coarse woody debris would be retained to provide wildlife and soil benefits (see Table 2-4). Following harvest, additional work would occur as needed and as described below under “Post Harvest Treatment Activities”.

Salvage/Regeneration Harvest

The Salvage/Regeneration prescription would be applied in stands where the level of fire or insect-caused tree mortality is high and the stand would no longer be considered adequately stocked following salvage harvest. Dead or dying trees would be harvested to recover economic value. Bark beetle infested trees would also be harvested. Incidental live tree removal may also occur to facilitate logging operations and in trees affected by root rot, stem decay, other pathogens, or severe fire damage. Adequate levels of snags and coarse woody debris would be retained to provide wildlife and soil benefits. Following harvest, additional work would occur as needed and as described below under “Post Harvest Treatment Activities.” Weeding treatments (see below) may also remove undesirable, unmerchantable live trees. After harvest and fuel reduction work is complete, the activity units would be monitored to determine if they need to be reforested by planting or if natural regeneration levels are sufficient to meet stand stocking goals. All or portions of units where natural regeneration is inadequate would be manually planted with tree seedlings.

Sanitation/Salvage Harvest

This prescription would be applied in stands where the level of tree mortality is relatively low and the stand would still be considered adequately stocked following harvest. This activity is a combination of salvage harvest (as described above) and sanitation harvest.

Sanitation harvest would remove Douglas-fir trees that are infected with dwarf mistletoe, a pathogen that spreads to other Douglas-firs and affects tree vigor, growth, and form. Removing the infected trees would stop or slow the spread of this pathogen within a stand. Trees with an infection rating of moderate to heavy (rating level 4-6 as defined by Hawksworth, USDA, 1977) would be removed in three units.

Incidental live tree removal may also occur to facilitate logging operations and in trees affected by root rot, stem decay, other pathogens, or severe fire damage. Adequate levels of snags and coarse woody debris would be retained to provide wildlife and soil benefits. Following harvest, additional work would occur as needed and as described below under “Post Harvest Treatment Activities.” Weeding treatments (see below) may also remove undesirable, unmerchantable live trees.

Sanitation/Salvage/Regeneration Harvest

The Sanitation/Salvage/Regeneration prescription would be applied in stands where the level of fire or insect-caused tree mortality and pathogen infection are high and the stand would no longer be considered adequately stocked following harvest. Dead, dying, and diseased trees would be harvested to recover economic value. Bark beetle infested trees and pathogen infected trees would be removed. Adequate levels of snags and coarse woody debris would be retained to provide wildlife and soil benefits. Incidental live tree removal may also occur to facilitate logging operations and in trees affected by root rot, stem decay or severe fire damage. Adequate levels of snags and coarse woody debris would be retained to provide wildlife and soil benefits. Following harvest, additional work would occur as needed and as described below under “Post Harvest Treatment Activities.” Weeding treatments (see below) may also remove undesirable, unmerchantable live trees.

After harvest and fuel reduction work is complete, the activity units would be monitored to determine if they need to be reforested by planting or if natural regeneration levels are sufficient to meet stand stocking goals. If natural regeneration were inadequate, portions or all of the units would be manually planted with tree seedlings.

Two fuel reduction methods may occur concurrently with harvest operations: whole tree yarding or yarding tops. These methods are defined as follows:

Whole tree yarding is a fuel reduction treatment in which logs are skidded with tops and limbs attached. Limbs and tops are piled at the landing for disposal or utilization. Whole tree yarding can be a final or intermediate fuel treatment. This method can be used in conjunction with other fuel treatments (e.g., lopping, jackpot burning, etc.).

Yarding tops is a fuel reduction treatment in which tops (the section of the tree bole above the minimum useable top diameter) from harvested trees are skidded to the landing for disposal or utilization. Yarding tops can be a final or intermediate fuel treatment and may be used when economic or resource concerns limit other fuel reduction options, particularly when skyline yarding.

Post-Harvest Treatment Activities

The following treatments would occur following harvest to reduce fuels created during harvest activities or improve stand health. Single treatments or combinations of the following methods would be applied as needed in a given activity unit, depending on site-specific fuel and stand characteristics, as well as consideration for operational efficiency and cost effectiveness.

Weeding removes smaller diseased (e.g. trees infected with dwarf mistletoe) and/or suppressed trees, to facilitate stand establishment and improve overall stand health and vigor. Weeding involves felling unmerchantable, undesirable trees left after harvesting operations to prevent competition with establishing regeneration and reduced potential for pathogen infection.

Jackpot Burning involves burning scattered accumulations of activity and natural fuel within treatment units under specified weather and fuel conditions.

Lopping and scattering is a fuel reduction treatment in which activity fuels (e.g., tree limbs) are cut and scattered to reduce the depth of the fuels throughout the treatment area. Lopping facilitates decomposition and nutrient cycling by placing the fuels closer to the forest floor and also facilitates meeting Forest Plan standards for big-game movement (slash should be less than 2 feet deep).

Logging Systems

Logging systems would include ground-based and skyline yarding systems. Ground-based systems are used on gentler slopes and include wheeled or tracked equipment that raises the forward end of logs when skidding. Ground-based equipment operation would be limited to snow covered or frozen ground conditions to minimize impacts to soils, except in four locations where logs would be skidded from “tracked line machine” settings to the nearest system road (refer to discussion below). Skyline yarders are used on steeper slopes and use a cable stretched between the skyline machine’s tower and a fixed anchor (typically a stump or base of a tree). A carriage travels along the cable and suspends either the front end of the logs or the entire log(s) off the ground during transport from the woods to a landing. Table 2-1 specifies the logging systems for each harvest unit in this alternative.

A “tracked line machine” (TLM) may be used in portions of five units (1, 4, 11, 13, & 14) in the Lyman Project. A TLM is a skyline yarder mounted on a tracked excavator. This equipment can “walk” out ridges to access skyline ground without needing a road. Logs are then skidded with ground-based equipment from the TLM landing to the nearest system road for loading and hauling. The ground-based skidding would be required to be done when snow and frozen ground conditions would protect soils.

This alternative includes the construction of one temporary road (see Map II-1), which is approximately 1,300 feet long, and is needed to access a portion of Unit 5.

No permanent roads would be constructed in this alternative. Log landings would be located along existing roads whenever possible. Where existing landings are not available, new landings may need to be constructed. Landings would be kept to the minimum number needed for efficient and safe operations. Landings would be cleaned up and/or rehabilitated following use (refer to Table 2-4).

These photographs illustrate the harvest activities similar to those proposed in the Lyman Salvage project. They are provided to help the reader visualize how stands look before and after treatment (see Figures 2-1 and 2-2 below). Sufficient numbers of snags that do not present safety hazards would be left to provide coarse woody debris for wildlife and soil benefits (refer to Table 2-4).

Figure 2-1 - Untreated Area



Figure 2-2 - Area Treated Using the Salvage/Regeneration Harvest Prescription



Reduce Road Sediment

Road maintenance, decommissioning and storage would occur in Alternative 2 and 3 to reduce erosion from existing roads in the project area. Map II-1 shows the roads locations and Table 2-2 lists roads to be maintained, stored or decommissioned.

Road Maintenance

Several roads in the analysis area that are needed for ongoing access and would be used for timber hauling would be brought up to Best Management Practice (BMP) standards. BMP roadwork improves drainage and stabilizes sediment sources to protect watershed and aquatic values (refer to the “Watershed” section of Chapter 3 and Appendix A for more information on BMPs). This work would be in the “maintenance” category and would not result in any changes in road management objectives or motorized access opportunities. Maintenance work would focus on reducing erosion from roads and reducing sediment input to streams. This would be accomplished by blading and shaping the road surface; installing drive-through dips or additional culverts; graveling segments immediately adjacent to streams and potholes or soft spots; and stabilizing and cleaning cross-drain culvert inlets and outlets. Approximately 35 miles of road would receive maintenance treatments to meet BMP standards.

Road Decommissioning

Two roads that are currently have yearlong or seasonal motorized access restrictions and are not needed for future access would be removed from the Forest’s transportation system; commonly referred to as “decommissioned” (Table 2-2). Following haul use, these roads would be decompacted, stream crossings restored, and revegetated. Recontouring would typically occur in the beginning road segment, at stream crossings, and where unstable cut and fill slopes exist. Some reduction in motorized access opportunity would result from the road decommissioning.

Road Storage

Eight roads or road segments that are currently have yearlong or seasonal motorized access restrictions and will not be needed for the foreseeable future would be “placed in storage”. They would remain on the Forest’s transportation system and be available for use in the future. Maintenance would not be necessary on these roads unless they are later reopened. Following haul use, storage activities would remove culverts, decompact the road surface, install no-maintenance cross ditches, and revegetate. Unlike road decommissioning, these activities leave the road prism in place for future use. Some changes in motorized access opportunity would result from the road storage. A 1.6-mile segment of one road that is currently restricted yearlong for motorized access would be opened to allow yearlong motorized access. All or segments of six roads other roads totaling 5.6 miles would change from seasonally restricted to yearlong motorized access restrictions.

Table 2-1 Alternative 2 -Timber Harvest Activities

Unit	Product(s)	RX/Silv System	Acres	Logging System (Acres)		MBF Volume	Fuel Treatment
				GB	Sky		
1	Sawtimber	Salvage - Salv/Regen	36	29	7	252	Yard tops, Lop & scatter
2	Sawtimber & Firewood	Salv/Regen	7	0	7	43	None
3	Sawtimber & Firewood	Salv/Regen	19	10	9	76	None
4	Sawtimber & Firewood	Salv/Regen	122	60	62	488	Lop & scatter
5	Firewood	Salv/Regen	113	79	34	452	None
6	Sawtimber	Sanit/Salv - Sant/Salv/Regen	29	0	29	232	Whole tree yard, weed
7	Firewood	Salv/Regen	3	0	3	9	None
8	Sawtimber & Houselog	Salvage to Salv/Regen	16	16	0	32	Whole tree yard, weed
9	Sawtimber	Sanit/Salv/Regen	76	46	30	532	Whole tree yard, weed, lop & scatter, hand pile & burn piles
10	Firewood	Salv/Regen	8	5	3	24	None
11	Sawtimber	Sanit/Salv - Sanit/Salv/Regen	45	0	45	135	Yard tops, weed
12	Sawtimber & Firewood	Salv/Regen	27	4	23	135	Whole tree yard, weed
13	Sawtimber	Salvage to Salv/Regen	40	37	3	100	Yard tops, Jackpot burn
14	Sawtimber & Firewood	Salv/Regen	28	1	27	168	Jackpot burn
	Total		569	287	282	2678	

Table 2- 2 Alternatives 2 and 3 - Watershed Improvement Road Work

Road Number	Total Length	Current Travel Restriction	Road Maintenance (Miles)	Road Storage (Miles)	Road Decommissioning (Miles)
311	>20	Seasonal	22.4		
717	3.0	Open	2.2		
1398	2.6	Open/Seasonal	2.6		
1398A	2.0	Seasonal	0.6		
73026	2.7	Open	1.5		
73145	2.6	Seasonal		2.6	
73167	2.7	Seasonal	2.4	0.3	
73169	1.3	Seasonal	1.0	0.3	
73170	1.0	Seasonal	0.8	0.2	
73168	1.8	Seasonal		1.8	
74940	0.4	Seasonal			0.4
73172	3.3	Year-long		3.3	
13304	5.1	Year-long	1.6	3.5	
73219	1.0	Year-long			1.0
73220	0.6	Year-long		0.6	
Total			35.1	12.6	1.4

**Map II-1. Alternative 2 - Treatments
INSERT MAPs**

MAP II-2 Alternatives 2 and 3 - Road Work and Watershed Improvements

Alternative 3

Alternative 3 modifies the proposed action in response to the previously described key issues:

Impacts on Soils and Watersheds

This alternative would result in fewer short-term impacts to soils and watersheds by reducing the area of harvest activity in the proposed action. Also, no temporary roads would be constructed. The dropped activity units are located in areas of high severity burn, and are mostly ground based logging system areas located in the Lyman Creek drainage, the most sensitive sub-watershed in the Cameron Creek drainage. Like Alternative 2, road sediment reduction activities would produce long-term benefits to enhance watershed and aquatic values.

Economics

This alternative drops or reduces the size of certain harvest units considered in the proposed action that is more economically marginal. It also adds one 12-acre salvage harvest unit, which would further improve project economics.

Management Requirements and Mitigation Measures that apply to Alternative 3 are described later in this Chapter (see Table 2-4).

Timber Harvest and Fuel Treatment Activities

Wood products would be salvaged from 378 acres of National Forest land by conducting harvest activities as itemized in Table 2-3 and in activity units displayed on Map II-2. The silvicultural prescriptions applied in this alternative are the same as described for Alternative 2. Fuel reduction and post harvest treatment activities would also be implemented, as described previously (refer to Alternative 2) and detailed in Table 2-3.

Logging Systems

The logging systems that would be used in this alternative are the same as those described for Alternative 2.

Like Alternative 2, no permanent roads would be constructed in this alternative. There are also no temporary roads that would be needed. Log landings would be located along existing roads whenever possible. Where existing landings are not available, new landings may need to be constructed. Landings would be kept to the minimum number needed for efficient and safe operations.

Reduce Road Sediment

Road maintenance, decommissioning and storage would occur in Alternative 3 to reduce erosion from existing roads in the project area. Map II-2 shows the road locations and Table 2-2 lists the roads to be maintained, stored, or decommissioned (this work would be the same as described for Alternative 2).

Road Maintenance

Roads in the project area that are needed for ongoing access and that would be used for timber hauling would be brought up to BMP standards, as described previously for Alternative 2. Approximately 35.1 miles of road would receive maintenance treatments to meet BMP standards.

Road Storage and Decommissioning

Miles of road stored and decommissioned will be the same as alternative 2, approximately 12.6 miles of road would be stored and 1.4 miles decommissioned. These activities are described under Alternative 2. As in Alternative 2, the road storage and decommissioning would change motorized access opportunities in the Lyman area.

Table 2- 3 Alternative 3 - Timber Harvest Activities

Unit	Product(s)	RX/Silv System	Acres	Logging System (acres)		MBF Volume	Fuel Treatment
				GB	Sky		
1	Sawtimber	Salvage to Salv/Regen	36	29	7	252	Yard tops, lop & scatter
2	Sawtimber & Firewood	Salv/Regen	7	0	7	43	None
3	Sawtimber & Firewood	Salv/Regen	19	10	9	76	None
4	Sawtimber & Firewood	Salv/Regen	64	7	57	320	Lop & scatter
6	Sawtimber	Sant/Salv - Sant/Salv/Regen	29	0	29	232	Whole tree yard, weed
9	Sawtimber	Sant/Salv/Regen	78	47	31	546	Whole tree yard, weed, lop & scatter, handpile/burn
11	Sawtimber	Sant/Salv - Sant/Salv/Regen	45	0	45	135	Yard tops, weed
12	Sawtimber & Firewood	Salv/Regen	27	4	23	135	Whole tree yard, weed
13	Sawtimber	Salvage to Salv/Regen	33	30	3	83	Yard tops, Jackpot burn
14	Sawtimber & Firewood	Salv/Regen	28	1	27	168	Jackpot burn
15	Sawtimber	Salvage to Salv/Regen	12	12	0	72	Whole tree yard, weed
	Total		378	140	238	2062	

Map II-3. Alternative 3 - Treatments

Management Requirements and Mitigation Measures

Management requirements and mitigation measures have been formulated to reduce the impacts associated with the action alternatives. These measures are an integral part of each of the action alternatives.

Table 2- 4 Management Requirements and Mitigation Measures for Alternatives 2 and 3

Minimize Soil Erosion and Compaction		
Minimize the size and number of landings to that needed for safety and operation of equipment. Where soil material from the landing could be transported into ephemeral draws, or intermittent or perennial channels, windrow slash or use silt fence below the landings for an erosion filter.		
Landings, skid trails, and disturbed sites will be rehabilitated. Techniques may include re-contouring, spreading topsoil (if available), ripping, waterbarring, seeding or planting with shrubs, and having slash scattered over them. Those landings along classified roads will be evaluated on a case-by-case basis and either cleaned up and used as a turnout for the road or be removed from the road through rehabilitation.		
Skyline corridors will be monitored and rehabilitated as needed. Techniques typically include anchoring large woody debris in the cable corridors to act as water bars, or breaching the berm with water bars, raking displaced material (berm) back over the corridor, and pulling adjacent woody debris to cover bare areas of the corridors.		
Decommission temporary roads. This will typically include ripping and/or re-contouring, seeding, and spreading available slash over the former road surface. This will be done as soon as practical after logging operations are complete.		
On roads to be used for winter hauling, the Forest Service will locate snow berm drains and cross-drains and contractor will install snow drainage features prior to hauling.		
On Forest roads proposed for decommissioning: culverts will be removed; areas adjacent to the removed culvert will be ripped and partially re-contoured, seeded and fertilized. The remainder of the road will be ripped (except where the surface is already dominated by shrubs or trees) and have available slash scattered over the roadbed. The road entrance will be blocked or re-contoured.		
No harvesting will occur on slopes greater than 75% (37° slope angle).		
In units designated for skyline yarding, at least one end of the log will be suspended off the ground during yarding.		
Ground-based harvest will occur on slopes less than 35% downhill and 20% uphill during the winter when snow cover and frozen soil conditions exist that will adequately protect the soil resource. The determination of adequate winter conditions will be made by the sale administrator in consultation with the project soil scientist or watershed specialist on a site-specific and on-going basis. Guidelines commonly used for adequate winter conditions are soils frozen to a depth of 4 inches, 24 inches of settled snow, or a combination of frozen ground and snow cover deemed sufficient to protect soils. Landings and main skid trails will be designated and approved by the sale administrator in advance. Existing skid trails will be used to the extent possible where they coincide with main skid trails. Dispersed skidding that is tributary to the main skid trails may occur. Winter ground-based harvest operations will be monitored and will cease if the soil thaws or if equipment is breaking through snow to thawed ground.		
Harvest and fuel treatments on high severity burns will leave enough slash distributed over the unit to contribute to 30-60 % effective ground cover, where available.		
No site preparation with heavy equipment will occur.		
Slash piles should be no more than 20 feet in diameter and no less than 6 feet high to minimize the potential for creating habitat for noxious weeds and to protect the organic soil layer and plant roots.		
Coarse woody debris (CWD) should be maintained at or above the following minimum levels (by VRU and fire severity) within the harvest activity units in order to maintain soil productivity (and provide wildlife habitat). CWD is material 4 inches in diameter and larger and will be generally well distributed across the activity unit. CWD can be standing or on the forest floor.		
VRU	Fire Severity	CWD (tons/ac)
2	Low	5
2	Mod/High	10
3	Low/Moderate/High	20
4	Low/Moderate/High	25

Ensure that Water-Related Beneficial Uses Are Protected and that State Water Quality Standards are Met
All activities will comply with Montana Streamside Management Zone (SMZ) regulations.
Ground-based equipment will be prohibited from entering SMZs without the appropriate variance from Montana DNRC. Boundaries of Riparian Habitat Conservation Areas (RHCAs) will be flagged to exclude equipment operation.
Ground based timber harvest will occur when winter conditions (snow cover and/or frozen ground) are present to limit ground disturbance and potential for erosion.
Forest roads will be protected from damage during haul operations. Road conditions will be monitored by TSA and/or resource specialists to ensure that road conditions do not result in sediment input to streams.
Best Management Practices will be applied and monitored during the administration of the contract. Applicable BMPs are located in the Project File and summarized in Appendix A.
Disturbed sites will be evaluated and TSAs and/or resource specialists will determine erosion control needs. Topography, presence and condition of adjacent vegetation, and amount of disturbance will be used to determine need and treatment. Appropriate erosion control may include seeding, planting of shrubs, mulch and/or scattering of slash in the disturbed area.
Roads that are stored or decommissioned will be decompacted, natural drainage patterns will be restored, culverts removed, appropriate sections recontoured, slash scattered over the surface, seeded and the entrance blocked or recontoured to prevent entry. Water bars or cross drains will be installed where needed. Bitterroot BMP 11.02 will be applied to limit sediment input to streams.
Road maintenance activities including snowplowing and dust abatement will follow the requirements specified in the USFSW Bull Trout Programmatic Agreement (1999). Prior to winter hauling on roads that closely parallel streams (such as Road 311 along Guide Creek) snow berm drainage locations will be pre-designated and sediment traps (e.g., straw bales) installed at appropriate locations.
Preserve and Protect Fisheries Habitat
No trees will be harvested within INFISH RHCAs. If trees felled outside of the RHCAs land or roll into the RHCAs, their boles may be removed, but the tops and limbs will be left behind. The RHCAs are: <ul style="list-style-type: none"> - within 300 feet of fish-bearing streams - within 150 feet of permanently flowing, non-fish bearing streams - within 100 feet of seasonally flowing or intermittent streams - within 150 feet of ponds, lakes or wetlands > 1 acre in area - within 50 feet of ponds, lakes or wetlands < 1 acre in area - within 100 feet of landslide prone areas
RHCA boundaries will be designated on the ground in consultation with the fisheries biologist.
In RHCAs, trees can be felled when they pose a safety risk. Felled hazard trees will be left on-site (INFISH standard RA-2).
New log landings will not be created in RHCAs. Existing openings/clearings in RHCAs may be used for landings if approved by a Fisheries Biologist prior to their use. If needed, silt fence and/or straw bales will be installed around portions of landings to protect RHCAs from landing-caused erosion and sediment.
Generally, no fuel storage, mixing of fuels, or refueling equipment will occur in RHCAs. If there are no other alternative areas, refueling sites in RHCAs may be used, but they must be approved by a fisheries biologist and have an approved spill containment plan prior to their use (INFISH standard RA-4).
If drafting from streams occurs, intake hoses must be fitted with a screen mesh equal to or smaller than 3/32 inches. Intake hoses will be placed in low velocity portions of the stream channel (< 0.4 feet/second of flow).
All road maintenance activities, including snow plowing and dust abatement, will comply with the programmatic road maintenance biological assessment for bull trout.
Protect TES Plant Populations and their Habitat/Promote Healthy Native Plant Communities
Follow requirements and recommendations for noxious weed management when conducting ground disturbing activities, as outlined in FSM 2000, Zero Code 2080 – Noxious Weed Management (R1 Supplement No. 2000-2001-1). Requirements include cleaning equipment prior to moving it into the project area, minimizing soil disturbance, and revegetating disturbed soil where native plant recovery may be delayed (consult Forest Botanist for specific recommendations).
Disturbed areas within skyline cable corridors and elsewhere will be seeded and fertilized using the recommendations of the Forest Botanist.

Provide Wildlife Habitat

Snags will be maintained at the following levels within activity units, as determined by the predominant Vegetation Response Unit (VRU) within each unit:

VRU	Snags (average trees/acre)
2	2-5
3	4-12
4	10-15

- Stand level prescriptions by a certified silviculturist and wildlife biologist will provide unit specific snag retention requirements including spatial distribution, species, and snag sizes.
- Distribution of retained snags in groups will generally be irregular and clumped.
- Retained snags will reflect the pre-harvest tree size class distribution present in the stand.
- Older snags (snags which existed prior to the fires) and broken top trees will be protected to the extent practicable.
- In treatment areas within lynx habitat (VRU4) concentrate snags in groups in areas with heavier concentrations of downed coarse woody debris, where available.

Where hand piling is the prescribed fuel treatment method, leave 10-30% of the piles unburned and distributed throughout the units for wildlife habitat.

Log hauling will be prohibited on the section of Road 311 that is closed to motorized access during the big game rifle season in order to provide big game security and a quality hunting experience.

In units prescribed for sanitation harvest or weeding, a wildlife biologist will designate areas that qualify as big game thermal cover and these habitat attributes will be retained.

Provide for the Safety of Forest Users

Forest roads will be protected from damage, such as deep rutting, during haul operations. Dust abatement and snow plowing specifications will be consistent with mitigation measures in the Bull Trout Road Maintenance Biological Assessment (April, 1999).

Stumps from slashed trees will be less than 6 inches high and no more than 45 degrees from horizontal.

Standard logging operation signs and log hauling signs will be posted in appropriate places to notify Forest visitors during logging and hauling operations.

Maintain or Protect Air Quality/Prescribed Fire

Smoke sensitive areas, such as the Selway-Bitterroot Wilderness and the Bitterroot and Missoula Valleys will be identified in each specific burn plan. Prescribed burns will be scheduled when smoke would not accumulate in unacceptable concentrations and to reduce effects on these smoke sensitive areas. Extended meteorological and weather forecast on mixing height, atmospheric stability and wind speed will be reviewed prior to burning to ensure that federal and state ambient air quality standards are met. Firing techniques will be applied that minimize smoke output.

Detailed management-ignited prescribed burn plans will be developed and adhered to for all burning operations. Prescribed burning will occur when adequate fuel moisture levels exist to remove only those fuels needed to meet objectives.

Appropriate fire mop-up actions will be taken to reduce smoke impacts and minimize escape risk.

Protect Residual Trees and Natural Regeneration

In areas jackpot burned, residual desirable overstory Douglas-fir trees will be protected from fire heating to avoid predisposing them to bark beetle attack in infested areas.

Areas of acceptable natural regeneration that meet stand stocking and species preference objectives will be protected from prescribed burning fire effects to the extent practicable.

Protect Archaeological Sites

If previously unknown heritage resources are encountered during implementation of the project, activities will be halted and the Forest Archaeologist will be notified immediately. Activities will not be resumed until adequate protective measures are developed and specified in the field.

Monitoring

A project monitoring plan is provided in Appendix B. The specified monitoring is an integral feature of all the action alternatives.

Alternatives Considered But Not Given Detailed Study

The interdisciplinary team considered the following alternatives, but did not study them in detail.

An alternative that uses prescribed fire instead of mechanical harvest methods was considered. The focus of the proposal is to remove dead and dying trees before they lose their economic value. Using only prescribed fire would not achieve that goal, so the ID Team did not consider this alternative further.

An alternative that precludes logging and instead focuses on watershed restoration via road obliteration and sediment source reduction on retained roads was considered. The proposal does not include any new road construction and focuses on salvaging dead and dying trees before they lose their economic value. Such an alternative would not achieve this goal. Road sediment reduction work is considered in the action alternatives.

The ID Team considered but did not study an alternative that would allow salvage harvest in Riparian Habitat Conservation Areas (RHCAs). A Bitterroot Forest Plan standard (INFISH standard TM-1) prohibits timber harvest in RHCAs with two exceptions. Exception (a) allows fire salvage in RHCAs as long as it does not retard (slow down) or prevent the attainment of the Riparian Management Objectives (RMOs) for pools, water temperature, and bank stability. Exception (b) allows silvicultural practices to occur in RHCAs if needed to attain the RMOs. In other words, in order to allow salvage harvest in RHCAs, it must be demonstrated how that harvest would improve the attainment of the RMOs and fish habitat, and we cannot retard or degrade the other RMOs. In summary, water temperatures are currently elevated, and all shade in the RHCA is needed to moderate temperatures. Removing additional shade would degrade/retard the water temperature RMO and potentially harm native westslope cutthroat trout. Allowing salvage in the RHCAs would also degrade/retard woody debris recruitment, which is needed to improve the quality of pool habitat - another RMO that needs improvement. Allowing salvage in the RHCAs also has the potential to degrade/retard channel stability - another RMO that needs improvement. Salvage harvest in the RHCAs has the potential to further degrade the RMOs, and is not needed to attain any RMOs. Thus, salvage would not meet the two exceptions in INFISH standard TM-1 and would be inconsistent with Forest Plan direction.

The ID Team considered an alternative that would allow ground based skidding during non-winter seasons but did not study it in detail due to the sensitive soil conditions and noxious weed invasion risk that remain following the fires of 2000. Burn severity and loss of ground cover remains a concern in tractor units and the winter ground-based skidding requirement is considered appropriate to ensure that soils are adequately protected and weed invasion risk minimized. Bitterroot NF monitoring of ground based skidding of post- 2000 fires salvage done over snow covered / frozen ground conditions clearly demonstrates that this has effectively protected the soil resource.

Comparison of Alternatives

Table 2-5 provides an overview and comparison of the major elements and key issues of the project alternatives. Refer to the previous descriptions of the alternatives for more details. Effects of the alternatives are discussed in greater detail in Chapter 3.

Table 2- 5 Alternative Comparison

	Alternative 1	Alternative 2	Alternative 3
Harvest Acres	None	569	378
Logging systems: ground based and (skyline) acres	0	287 (282)	140 (238)
Planting Acres	None	294 to 437 acres, depending on natural regeneration levels.	259 to 378 acres, depending on natural regeneration levels
Fuel Reduction Activities	None	Various harvest methods, manual treatments, and prescribed fire (see Tables 2-1 and 2-3)	Various harvest methods, manual treatments, and prescribed fire (see Tables 2-1 and 2-3)
Road Sediment Reduction	No changes	Decommission 1.4 miles of road Put 12.6 miles of road in storage. Road maintenance (BMP upgrades) 35.1 miles.	Decommission 1.4 miles of road Put 12.6 miles of road in storage. Road maintenance (BMP upgrades) 35.1 miles.
Temporary Roads	None	1300 feet of temporary road	None
Impacts to Soil Productivity	None	Minor effect	Minor effect, less than Alt 2
Impacts to Watersheds	No short-term effects. Minor long-term effects	Minor short-term effects Beneficial long-term effects due to erosion and sediment reduction activities	Minor short-term effects, less than Alt 2. Beneficial long-term effects due to erosion and sediment reduction activities
Motorized Access Change	None	1.6 miles of seasonally closed road will be opened to year-round motorized access. 5.6 miles of road would change from seasonal motorized use to year-round restriction due to road storage and decommissioning.	1.6 miles of seasonally closed road will be opened to year-round motorized access. 5.6 miles of road would change from seasonal motorized use to year-round restriction due to road storage and decommissioning.
Economics			
Planning costs	\$20,000	\$20,000	\$20,000
Net Stumpage value (log prices less logging/haul costs)	0	\$83,200 (\$31.07/MBF)	\$78,000 (\$37.83/MBF)
Planting cost	0	\$180,000	\$160,000
Road work cost	0	\$173,425	\$173,425